In the Specification:

Please make the following changes to the specification paragraphs below:

Page 3, lines 12-19:

Further, the linear transmission rate of a ceramic envelope depends on the surface roughness Ra, and thus, ~~the~~a smaller Ra is advantageous. Although the surface roughness of the interior surface of the ceramic envelope can be controlled by means of polishing, the process becomes complex, which is not rational. In addition, MgO or La_2O_3 and the like which ~~is~~are weaker with respect to a relevant halide than alumina mixed as an additive, appears on the interior surface by such polishing. Thus, there has been a disadvantage to maintain good electric discharge characteristics.

Page 6, lines 17-22:

wherein the barrel section thickness of at least one of the boundary sections between both of the barrel section and closing section is continuously increased at a ratio from 1.2 to 2.0 relevant to the thickness in the vicinity of the center of an electric discharge light emitting space, and a ratio ~~if~~of a diameter in the vicinity of an end of the barrel section to a diameter of the center of the barrel section is equal to or greater than 0.8, and is less than 1.0.

Page 7, lines 7-16:

According to a fifth aspect of the present invention, there is provided a ceramic envelope for high intensity discharge lamp as ~~claimed in any of claims 1, 2, and 4~~described above, wherein the surface roughness Ra of the interior surface of the barrel section is from 0.01 μm to 0.4 μm, and the additive concentration of the surface of said barrel section is ½ or less of that in the vicinity of the center of the thickness.

According to a sixth aspect of the present invention, there is provided a ceramic envelope for high intensity discharge lamp ~~as claimed in claim 3 or 5~~, wherein an additive consists of at least one or more kinds of ScO_3, MgO, ZrO_2, Y_2O_3, and lanthanoid based rare earth oxide.

Page 9, lines 17-24:

These members are separately molded from an alumina-based component~~, and~~with MgO and the like as an additive. Then, the members are formed so as to give light transmission properties by integrally being assembled and ~~burned them~~fired. An example of dimensions of each section is shown here. An outer diameter D1 of the barrel section 1 is 11.6 mm, an inner diameter D2 is 9.4 mm, a length L1 is 19 mm, thickness W of the closing section is 3 mm, and a full length L2 of a light emitting tube is 47 mm. The surface roughness Ra including an interior surface is 0.2 μm.

Page 10, lines 11-22:

In this way, by adding the additives, abnormal grain growth of a ~~ceramics~~ceramic base phase essentially consisting of alumina is restrained, uniform grain growth can be produced, and the linear transmission rate can be increased. However, the surface roughness Ra is ~~preferable~~preferably within the range of 0.01 μm to 0.4 μm in view of light transmission properties and strength.

In addition, in a ~~burning~~firing process, the additive in the vicinity of the surface of the ceramic envelope is dispersed or scattered, whereby the surface additive concentration can be ½ or less as compared with the inside of the thickness. By doing this, the additive concentration of the surface of the ceramic envelope is not increased after ~~burning~~firing.

Therefore, reaction with halide that is a light emitting substance can be restrained, and the good electric discharge characteristics can be maintained.

Page 14, lines 9-17:

By means of a lost wax or by applying a frost molding technique, injection molding technique, or gel casting technique to the lost wax, such integration molding can be easily carried out. By carrying out integral molding, no wedge shaped cavity is formed, and the service life can be extended constantly. In addition, by carrying integral molding, ~~a rate~~the ratio of a diameter in the vicinity of an end of the barrel section 1 and a diameter in the vicinity of the center can be arbitrarily set. Further, the surface rough Ra of the interior surface of the barrel section can easily achieved to be within 0.01 μm to 0.4 μm.

In the Claims:

Please rewrite claim 4 as follows:

1. (Original) A ceramic envelope for high intensity discharge lamp made of a light transmission ceramics, comprising:

a cylindrical barrel section forming an electric discharge light emitting space;

an annular closing section that closes both ends of the barrel section, respectively;

a capillary section for inserting and fixing an electric discharge electrode to be outwardly protruded so as to be opposed to each other from a substantial center position of both closing sections,

wherein the barrel section thickness of at least one of the boundary sections between both of the barrel section and closing section is continuously increased at a ratio from 1.2 to 2.0 relevant to the thickness in the vicinity of the center of the electrical discharge light emitting space.

2. (Original) A ceramic envelope for high intensity discharge lamp made of a light transmission ceramics, comprising:

a cylindrical barrel section forming an electric discharge light emitting space;

an annular closing section that closes both ends of the barrel section, respectively;

a capillary section for inserting and fixing an electric discharge electrode to be outwardly protruded so as to be opposed to each other from a substantial center position of both closing sections,

wherein a ratio of an inner diameter in the vicinity of an end of said barrel section to an inner diameter of the center of the barrel section is equal to or greater than 0.8 and is less than 1.

3. (Original) A ceramic envelope for high intensity discharge lamp made of a light transmission ceramics, comprising:

a cylindrical barrel section forming an electric discharge light emitting space;

an annular closing section that closes both ends of the barrel section, respectively;

a capillary section for inserting and fixing an electric discharge electrode to be outwardly protruded so as to be opposed to each other from a substantial center position of both closing sections,

wherein a surface roughness Ra of the interior surface of said barrel section is 0.01 μm to 0.4 μm, and the additive concentration in the vicinity of the interior surface of said barrel section is ½ or less of that in the vicinity of the center of the thickness.

4. (Currently Amended) A ceramic envelope for high intensity discharge lamp made of a light transmission ceramics, comprising:

a cylindrical barrel section forming an electric discharge light emitting space;

an annular closing section that closes both ends of the barrel section, respectively;

a capillary section for inserting and fixing an electric discharge electrode to be outwardly protruded so as to be opposed to each other from a substantial center position of both closing sections,

wherein the barrel section thickness of at least one of the boundary sections between both of the barrel section and closing section is continuously increased at a ratio from 1.2 to 2.0 relevant to the thickness in the vicinity of the center of an electric discharge light emitting space, and a ratio ~~if~~of a diameter in the vicinity of an end of the barrel section to a diameter of the center of the barrel section is equal to or greater than 0.8, and is less than 1.0.

5. (Previously Amended) A ceramic envelope for high intensity discharge lamp as claimed in claim 1, wherein the surface roughness Ra of the interior surface of the barrel section is from 0.01 μm to 0.4 μm, and the additive concentration of the surface of said barrel section is ½ or less of that in the vicinity of the center of the thickness.

6. (Previously Amended) A ceramic envelope for high intensity discharge lamp as claimed in claim 3, wherein an additive consists of at least one or more kinds of Sc_2O_3, MgO, ZrO_2, Y_2O_3, and lanthanoid based rare earth oxide.

7. (Previously Added) A ceramic envelope for high intensity discharge lamp as claimed in claim 2, wherein the surface roughness Ra of the interior surface of the barrel section is from 0.01 μm to 0.4 μm, and the additive concentration of the surface of said barrel section is ½ or less of that in the vicinity of the center of the thickness.

8 (Previously Added) A ceramic envelope for high intensity discharge lamp as claimed in claim 4, wherein the surface roughness Ra of the interior surface of the barrel section is from 0.01 μm to 0.4 μm, and the additive concentration of the surface of said barrel section is ½ or less of that in the vicinity of the center of the thickness.

9 (Previously Added) A ceramic envelope for high intensity discharge lamp as claimed in claim 5, wherein an additive consists of at least one or more kinds of Sc_2O_3, MgO, ZrO_2, Y_2O_3 and lanthanoid based rare earth oxide.

10 (Previously Added) A ceramic envelope for high intensity discharge lamp as claimed in claim 7, wherein an additive consists of at least one or more kinds of Sc_2O_3, MgO, ZrO_2, Y_2O_3 and lanthanoid based rare earth oxide.

11. (Previously Added) A ceramic envelope for high intensity discharge lamp as claimed in claim 8, wherein an additive consists of at least one or more kinds of Sc_2O_3, MgO, ZrO_2, Y_2O_3 and lanthanoid based rare earth oxide.

In the Abstract:

Please make the following changes to the Abstract:

ABSTRACT OF THE DISCLOSURE

A ceramic envelope for a high intensity discharge lamp ~~comprises:~~is provided, including a cylindrical barrel section ~~1 that forms~~forming an electric discharge light emitting space~~;~~ and having annular closing sections ~~2, 2 that close~~closing both ends of the barrel section ~~1~~, respectively~~;~~, and capillary sections ~~3, 3~~ that insert and fix an electric discharge electrode to ~~be~~protrude outwardly ~~protruded~~ so as to ~~be opposed to~~oppose each other from the substantial center of both ~~of the~~ closing sections. The envelope essentially consists of alumina, and is formed to have light transmission properties by adding MgO. Then, the thickness of the barrel section at the boundary between the barrel section ~~1~~ and the closing section ~~2~~ is ~~formed to be~~ increased ~~in thickness~~ by providing a tapered section ~~4a to the thickness~~ in the vicinity of the center of an electric discharge light emitting space. ~~In this way, there is provided~~Thus, a high emitting envelope for high intensity discharge lamp capable of extending the service life of the lamp can be provided, even if the electric discharge space is cylindrical.

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REMARKS

Claims 1-11 are pending herein. Claim 4 has been amended merely to correct a minor matter of form. Applicants have amended the specification and Abstract to correct matters of form, as well. No new matter has been added.

If the Examiner believes that contact with Applicants' attorney would be advantageous in connection with this Rule 312 Amendment, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

June 10, 2003
Date

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